UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

OCT 25 2017

Mr. Thomas Frick
Director
Division of Environmental Assessment & Restoration
Florida Department of Environmental Protection
Mail Station 3000
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Dear Mr. Frick:

The U.S. Environmental Protection Agency has completed its review of the document titled *Nutrient TMDL for Lake Denham (WBID[1] 2832A)*. Florida Department of Environmental Protection (FDEP) submitted the Lake Denham Total Maximum Daily Load (TMDL) and revised chapter 62-304, Florida Administrative Code (F.A.C.),[2] including the numeric nutrient criteria (NNC) for the subject water, in a letter to the EPA dated June 19, 2017 as a TMDL and as new or revised water quality standards (WQS) with the necessary supporting documentation and certification by FDEP General Counsel, pursuant to Title 40 of the Code of Federal Regulations (CFR) part 131.

The NNC were adopted under chapter 62-304.500(21) as site specific numeric interpretations of paragraph 62-302.530(48)(b).[3] As referenced in paragraph 62-302.531(2)(a), FDEP intends for the submitted NNC to serve in place of the otherwise applicable criteria for lakes set out in paragraph 62-302.531(2)(b). The total nitrogen, total phosphorus, and chlorophyll *a* TMDLs for Lake Denham would also constitute site specific numeric interpretations of the narrative nutrient criterion set forth in paragraph 62-302.530(48)(b), for this water segment.

FDEP submitted the Lake Denham TMDL to the EPA for review pursuant to both Clean Water Act (CWA) sections 303(c) and 303(d) since the TMDL will also act as Hierarchy 1 (H1) site-specific interpretations of the state's narrative nutrient criterion pursuant to 62-302.531(2)(a)1.a. The EPA acknowledges that by virtue of establishing the TMDL in chapter 62-304, FDEP is also establishing an H1 interpretation of the narrative nutrient criterion for this waterbody as new or revised WQS. The enclosed, combined WQS and TMDL decision document summarizes the EPA's review and approval of the WQS and TMDL.

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[1] WBID refers to **w**ater**b**ody **id**entification.
[2] Unless otherwise stated, all rule and subsection citations are to provisions in the Florida Administrative Code.
[3] FDEP recently revised the table of surface water criteria set out at section 62-302.530, F.A.C., adding parameters to the table to incorporate new human health criteria promulgated by the state in 2016. These additions resulted in the state narrative nutrient criteria being renumbered from paragraphs 62-302.530(48)(a) and (b), F.A.C. to paragraphs 62-302.530(90)(a) and (b), F.A.C. The new criteria have not yet been submitted to the EPA for review under the CWA and are not effective for CWA purposes. In this document, the EPA refers to the narrative nutrient criteria as paragraphs 62-302.530(48)(a) and (b).

In accordance with sections 303(c) and (d) of the CWA, I am hereby approving the TMDL promulgated in chapter 62-304 for Lake Denham as both a TMDL and as revised WQS for total nitrogen, total phosphorus, and chlorophyll *a*. The requirements of paragraph 62-302.530(48)(a) remain applicable.

If you have any comments or questions relating to the approval of the H1 WQS or TMDL, please contact me at (404) 562-9345, or have a member of your staff contact Dr. Katherine Snyder in the WQS program at (404) 562-9840 or Ms. Laila Hudda in the TMDL program at (404) 562-9007.

Sincerely,

Mary S. Walker
Director
Water Protection Division

Enclosure

cc: Mr. Kenneth Hayman, FDEP
Ms. Stacey Cowley, FDEP
Mr. Daryll Joyner, FDEP
Ms. Erin Rasnake, FDEP

Florida Numeric Interpretation of the Narrative Nutrient Water Quality Criterion Through Total Maximum Daily Loads (TMDLs) to Establish a Hierarchy 1 (H1): Joint Water Quality Standards (WQS) and TMDL Decision Document

H1: Nutrient TMDL for Lake Denham (**waterbody identification** (WBID) 2832A)

ATTAINS TMDL ID: 67524

Location: Lake County, Florida

Status: Final

Criteria Parameter(s) (magnitude, duration, and frequency):
Total nitrogen (TN) = 16,468 kg/yr and total phosphorus (TP) = 593 kg/yr, expressed as long-term (7-year) averages of annual loads, not to be exceeded; chlorophyll *a* (Chl*a*) = 26.8 µg/L, expressed as an annual geometric mean (AGM), not to be exceeded.

Impairment/Pollutant: Lake Denham is not meeting water quality criteria for nutrients and not supporting the designated uses of fish consumption; recreation, and propagation and maintenance of a healthy, well balanced population of fish and wildlife. An H1 was submitted by Florida Department of Environmental Protection (FDEP) that establishes site specific criteria for TN, TP, and Chl*a* and provides loads to address the impairment.

Background: FDEP submitted the *FINAL Nutrient TMDL for Lake Denham (WBID 2832A) and Documentation in Support of Development of Site Specific Numeric Interpretations of the Narrative Nutrient Criterion* dated March 2017, hereafter referred to as the "Report," with a submittal letter to the EPA Region 4 dated June 19, 2017 requesting review and approval.

The submission included:

- Submittal letter
- Nutrient TMDL for Lake Denham (WBID 2832A) and Documentation in Support of the Development of Site Specific Numeric Interpretations of the Narrative Nutrient Criteria
- Documents related to Public Workshop
- Documents related to Public Hearing
- Documents related to Public Notice for Rulemaking and Rule Adoption
- Public Comments Received

This document explains how the submission meets the Clean Water Act (CWA) statutory and regulatory requirements for the approval of WQS under section 303(c) and of TMDLs under section 303(d), and the EPA's implementing regulations in Title 40 of the Code of Federal Regulations (CFR) parts 131 and 130, respectively.

REVIEWERS: WQS: Jamal Cooper, Environmental Engineer, cooper.jamal@epa.gov
TMDL: Florida TMDL Coordinator, hudda.laila@epa.gov

Waterbodies addressed in this H1 Approval Action:

Lake Denham is a shallow 250-acre lake located in central Florida approximately two miles southwest of Leesburg, Lake County, within the Ocklawaha River and the Lake Harris Planning Unit as shown in Figure 1. Lake Denham has a watershed area of 6,641 acres.

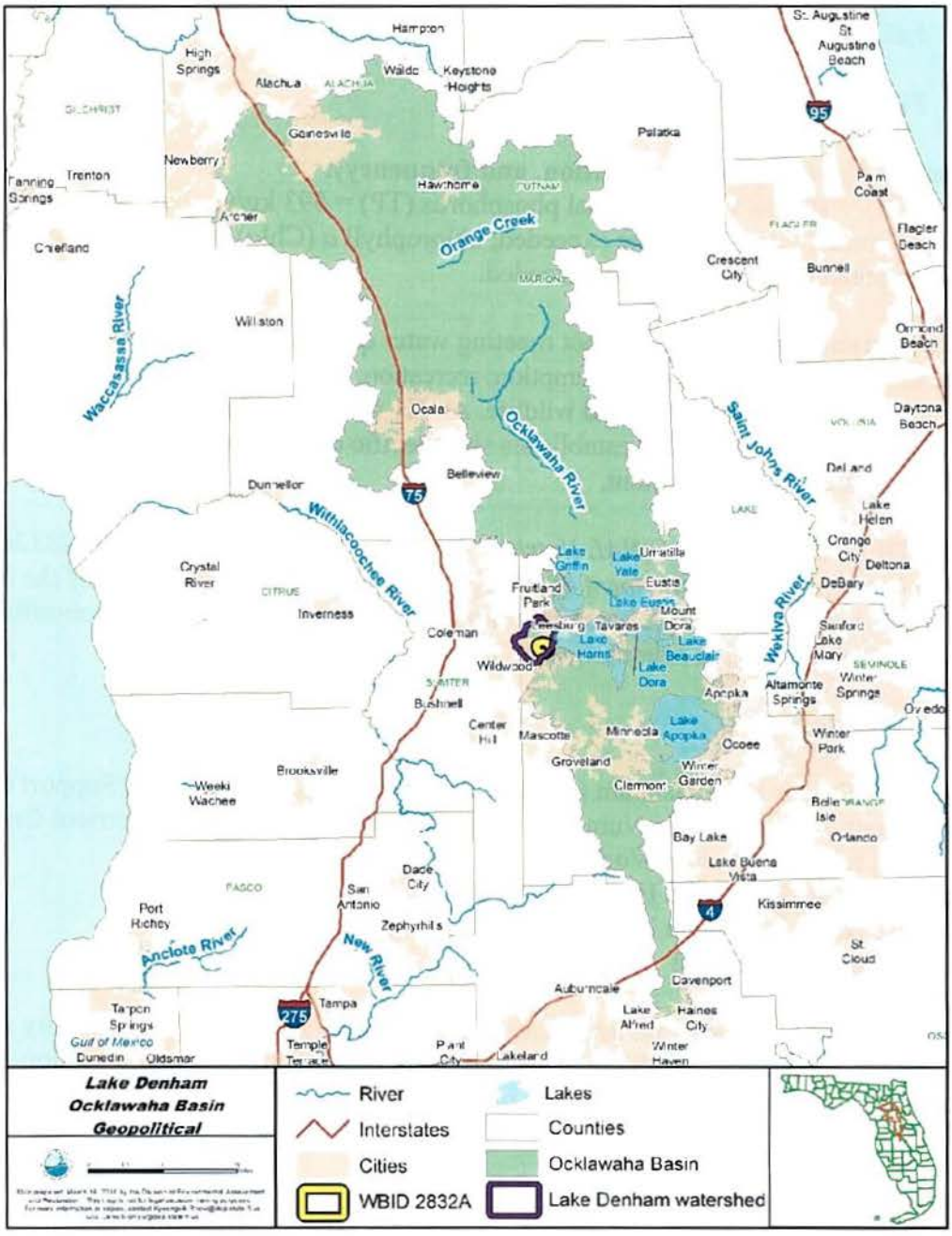

Figure 1: Location of the Lake Denham Watershed (WBID 2832A) in the Ocklawaha Basin and Major Geopolitical and Hydrologic Features in the Area

This document contains the EPA's review of the above-referenced H1. This review document includes WQS and TMDL review guidelines that state or summarize currently effective statutory and regulatory requirements applicable to this approval action. Review guidelines are not themselves regulations. Any differences between review guidelines and the EPA's implementing regulations should be resolved in favor of the regulations themselves. The italicized sections of this document describe the EPA's statutory and regulatory requirements for approvable H1s. The sections in regular type reflect the EPA's analysis of the state's compliance with these requirements.

I. WQS Decision – Supporting Rationale

Section 303(c) of the CWA and the EPA's implementing regulations at 40 CFR section 131 describe the statutory and regulatory requirements for approvable WQS. Set out below are the requirements for WQS submissions under the CWA and the regulations. The information identified below is necessary for the EPA to determine if a submitted WQS meets the requirements of the CWA and, therefore, may be approved by the EPA.

1. Use Designations

Section 131.10(a) provides that each state must specify appropriate water uses to be achieved and protected. The classification of the waters of the state must take into consideration the use and value of water for public water supplies, protection and propagation of fish, shellfish and wildlife, recreation in and on the water, agricultural, industrial, and other purposes including navigation. In no case shall a state adopt waste transport or waste assimilation as a designated use for any waters of the United States.

Assessment: Lake Denham is classified as Class III for fish consumption; recreation, and propagation and maintenance of a healthy, well-balanced population of fish and wildlife.

2. Protection of Downstream Uses

Section 131.10(b) provides that in designating uses of a waterbody and the appropriate criteria for those uses, the state shall take into consideration the WQS of downstream waters and shall ensure that its WQS provide for the attainment and maintenance of the WQS of downstream waters.

Rule 62-302.531(4) of the Florida Administrative Code (F.A.C.) requires that downstream uses be protected. Lake Denham drains to Lake Harris. A TP TMDL already developed for Lake Harris requires a 32% reduction in the TP load from the watershed area that includes the Lake Denham watershed. The Lake Denham TP TMDL will protect the water quality of Lake Harris, because the TP reduction for Lake Denham (61%) is higher than that required for Lake Harris. No TN reduction is needed for the Lake Harris nutrient TMDL. The proposed TN TMDL for Lake Denham, which requires a 61% reduction of TN, will provide further protection to downstream Lake Harris. The higher percent TP reduction requirement and the TN loading reduction for Lake Denham are more stringent than the nutrient reduction requirement to achieve the Lake Harris nutrient TMDL and therefore will further improve water quality in Lake Harris. The reductions in nutrient concentrations and loads prescribed in the TMDL are not expected to cause nutrient impairments downstream and are expected to result in water quality improvements to downstream waters.

Assessment: The Report adequately describes how the H1 protects downstream uses.

3. Water Quality Criteria

Section 131.11(a) provides that states must adopt those water quality criteria that protect the designated use. Such criteria must be based on sound scientific rationale and must contain sufficient parameters or constituents to protect the designated use. For waters with multiple use designations, the criteria shall support the most sensitive use.

The site specific nutrient criteria for Lake Denham are the TN and TP loads and Chl*a* concentration established in the nutrient TMDL. Those are a long-term (7-year) average of annual loads not to be exceeded of 16,468 kg/yr for TN and 593 kg/yr for TP, and an AGM not to be exceeded of 26.8 µg/L for Chl*a*. Any other criteria applicable to this waterbody remain in effect.

Assessment: The Report adequately describes the process used to derive water quality criteria that protect the designated use and provided a sound scientific rationale to establish the criteria.

4. Scientific Defensibility

Section 131.11(b) provides that, in establishing criteria, states should establish numerical values based on 304(a) guidance, 304(a) guidance modified to reflect site specific conditions, or other scientifically defensible methods.

Lake Denham is a high-color lake. The default numeric nutrient criteria (NNC), expressed as AGM concentrations not to be exceeded more than once in any 3-year period, are Chl*a* of 20 µg/L, TN of 1.27 – 2.23 mg/L, and TP of 0.05 – 0.16 mg/L.

These numeric interpretations of the narrative nutrient criterion were based on watershed and receiving water modeling of lake conditions using natural background watershed conditions that resulted in the revised Chl*a* criterion of 26.8 µg/L. Background TN and TP concentrations for the Lake Denham nutrient TMDLs were established using the 80th percentile of the model-simulated natural background condition. To estimate natural background conditions, FDEP used the BATHTUB model in which all human land uses were converted to natural land use (forest/rangeland) and all the internal loads and nitrogen fixation loads were eliminated. The 80th percentile of the natural background concentrations of TN and TP (1.10 mg/L for TN and 0.04 mg/L for TP) were established as the TMDL targets. At the 80th percentile of the natural background TN and TP concentrations, the model-simulated in-lake Chl*a* concentration was 26.8 µg/L. The TN and TP TMDLs were set at the loads that attained the target TN and TP concentrations. These loads, along with the target Chl*a* concentration, constitute the site specific interpretations of the narrative nutrient criterion for Lake Denham.

The criteria were developed based on application of the Natural Resources Conservation Service's watershed curve number model and the receiving water BATHTUB model that simulated hydrology and water quality conditions over the 2000–12 period. The primary datasets for this period include the water quality data from the Identification of Impaired Surface Waters Rule (IWR) database (IWR Run_49), rainfall and evapotranspiration data, and lake stage data for 2000–12 obtained from the St. Johns River Water Management District (SJRWMD). Land use data from two years were used to establish watershed nutrient loads. For the 2000–05 simulation period, the SJRWMD's 2004 land use was used. For the 2006–12 period, the SJRWMD's 2009 land use was used in the model simulation. The model simulated the 2000–12 period, which included both wet and dry years.

Because the nutrient targets for these TMDLs are based on natural background conditions, the TMDLs and resultant NNC are considered protective of the designated use. In addition, choosing the 80th percentile of TN and TP concentrations of unimpacted conditions is consistent with the methods used in developing the Florida's NNC as well as the EPA recommendation to set nutrient concentration targets based on the reference condition.

Assessment: The EPA determined that the TN and TP loads of 16,468 kg/yr and 593 kg/yr, respectively, for Lake Denham as the criteria are appropriate and the watershed and receiving water modeling method used by the state to determine a Chl*a* value that corresponds to the TN and TP targets is an appropriate and defensible method.

5. Public Participation

Section 131.20(b) provides that states shall hold a public hearing when revising water quality standards, in accordance with provisions of state law and the EPA's public participation regulation (40 CFR part 25). The proposed WQS revision and supporting analyses shall be made available to the public prior to the hearing.

A public workshop was conducted by FDEP on July 19, 2016 in Lady Lake, Florida, to obtain comments on the draft nutrient TMDLs for Lake Denham. The workshop notice indicated that these nutrient TMDLs, if adopted, constitute site specific numeric interpretations of the narrative criterion set forth in paragraph 62-302.530(48)(b), F.A.C.,[1] that would replace the otherwise applicable NNC in subsection 62-302.531 (2), for these particular waters. A public hearing on the proposed rule was held on February 3, 2017 in Tallahassee, Florida.

Assessment: FDEP has met the public participation requirements for this H1.

6. Certification by the State Attorney General

Section 131.6(e) requires that the state provide a certification by the state Attorney General or other appropriate legal authority within the state that the WQS were duly adopted pursuant to state law.

A letter from FDEP General Counsel, Frederick L. Aschauer, Jr., dated June 19, 2017 certified that the Lake Denham TMDL was duly adopted as WQS pursuant to state law.

Assessment: FDEP has met the requirement for Attorney General certification for this H1.

[1] FDEP recently revised the table of surface water criteria set out at section 62-302.530, F.A.C., adding parameters to the table to incorporate new human health criteria promulgated by the state in 2016. These additions resulted in the state narrative nutrient criteria being renumbered from paragraphs 62-302.530(48)(a) and (b), F.A.C. to paragraphs 62-302.530(90)(a) and (b), F.A.C. The new criteria have not yet been submitted to the EPA for review under the CWA and are not effective for CWA purposes. In this document the EPA refers to the narrative nutrient criteria as paragraphs 62-302.530(48)(a) and (b).

7. Endangered Species Act (ESA) Section 7 Consultation

Section 7(a)(2) of the ESA requires federal agencies, in consultation with the Services, to ensure that their actions are not likely to jeopardize the continued existence of federally listed species or result in the destruction or adverse modification of designated critical habitat of such species.

The existing default NNC for the waterbody received concurrence by U.S. Fish and Wildlife Service (USFWS) on July 31, 2013. USFWS provided concurrence with the EPA's programmatic consultation on site specific nutrient criteria for the FDEP on July 21, 2015 for any site specific nutrient criteria that are more stringent than the existing default nutrient criteria in place in the state of Florida for the waterbody. Because the site specific criteria for TN and TP for Lake Denham in this Report are more stringent than the default criteria, an additional ESA section 7 consultation for this standards action is not required.

The site specific criterion for Chl*a* in Lake Denham is less stringent than the default criterion, thus the EPA staff initiated informal section 7 consultation with USFWS Panama City Field Office staff via email from Katherine Snyder, Water Quality Standards Coordinator, to Channing St. Aubin, Biologist, dated October 11, 2016. The EPA has concluded that the Agency's action to approve the revised Chl*a* H1 numeric nutrient criterion for Lake Denham would have No Effect because the threatened and endangered species identified by USFWS or their critical habitat are not present in the action area of WBID 2832A (West Indian Manatee) or are not aquatic species (Wood Stork). Channing St. Aubin of the USFWS Panama City Field Office and Heath Rauschenberger of the North Florida Ecological Services Office were notified of the EPA's determination via email October 24, 2016.

Assessment: The EPA has met the ESA requirements for this action.

II. TMDL Review

Section 303(d) of the CWA and the EPA's implementing regulations at 40 CFR Part 130 set out the statutory and regulatory requirements for an approvable TMDL. The following information is generally necessary for the EPA to determine if a submitted TMDL fulfills the legal requirements for approval under section 303(d) and the EPA regulations, and should be included in the submittal package. Use of the verb "must" below denotes information that is required to be submitted because it relates to elements of the TMDL required by the CWA and by regulation.

1. Description of Waterbody, Pollutant of Concern and Pollutant Sources

The TMDL analytical document must identify the waterbody as it appears on the state/tribe's 303(d) list, including the pollutant of concern. The TMDL submittal must include a description of the point and nonpoint sources of the pollutant of concern, including the magnitude and location of the sources. Where it is possible to separate natural background from nonpoint sources, a description of the natural background must be provided, including the magnitude and location of the source(s). Such information is necessary for the EPA's review of the load and wasteload allocations, which are required by regulation. The TMDL submittal should also contain a description of any important assumptions made in developing the TMDL, such as: (1) the assumed distribution of land use in the watershed; (2) population characteristics, wildlife resources, and other relevant information affecting the characterization of the pollutant of concern and its allocation to sources; (3) present and future growth trends, if taken into consideration in preparing the TMDL; and (4) explanation and analytical basis for expressing the TMDL through surrogate measures, if applicable. Surrogate measures are parameters such as percent fines and turbidity for sediment impairments or Chla and phosphorus loadings for excess algae.

Lake Denham was placed on the Verified List of Impaired Waters for nutrient impairment based on the fact that in the Cycle 1, Group 1 assessment (verified period: January 1, 1995–June 30, 2002) the annual average TSI values exceeded the applicable criteria. The nutrient impairment was confirmed in Cycles 2 (January 1, 2000–June 30, 2007) and 3 (January 1 2005–June 30, 2012) assessments (Table 2.1 of the Report). In addition, FDEP assessed the water quality of Lake Denham using the NNC, which became effective on October 27, 2014 and Lake Denham did not attain the applicable lake NNC and remains impaired for nutrients.

The Lake Denham watershed is occupied by wetlands (50% of the watershed), agricultural areas (20%), and urban areas (14%). Overall, human land uses, including all the residential, commercial, industrial, and agricultural areas, accounted for about 32.2% of the total watershed area. The lake and its watershed are also a part of the Lake Harris watershed within the Central Valley Lake Region, which is characterized by high nutrients, high Chl*a* concentrations, and low transparency. The lakes in the region receive mineralized ground water and surface inflow through calcareous, nutrient-rich soils and are naturally eutrophic to hypereutrophic hard water lakes.

No National Pollutant Discharge Elimination System (NPDES) permitted wastewater facilities were identified in the Lake Denham watershed that discharge directly to surface waters. The stormwater collection systems owned and operated by Lake County and the City of Leesburg are covered by NPDES Municipal Separate Storm Sewer System (MS4) Phase II permits. Nonpoint sources primarily include loadings from surface runoff, ground water seepage entering the lake, and precipitation directly onto the lake's surface.

Assessment: The EPA concludes that FDEP has adequately identified the impaired water bodies, the pollutants of concern, and the magnitude and location of the pollutant sources.

2. Description of the Applicable WQS and Numeric Water Quality Target

The TMDL submittal must include a description of the applicable state/tribe WQS, including the designated use(s) of the waterbody, the applicable numeric or narrative water quality criterion, and the statewide antidegradation policy. Such information is necessary for the EPA's review of the load and wasteload allocations which are required by regulation. A numeric water quality target for the TMDL (a quantitative value used to measure whether or not the applicable water quality standard is attained) must be identified. If the TMDL is based on a target other than a numeric water quality criterion, then a numeric expression, usually site specific, must be developed from a narrative criterion and a description of the process used to derive the target must be included in the submittal.

Lake Denham is a Class III (fresh) waterbody, with a designated use of fish consumption; recreation, and propagation and maintenance of a healthy, well balanced population of fish and wildlife. The Class III water quality criterion that is applicable to the verified impairment (nutrients) for this water is Florida's narrative nutrient criterion in paragraph 62-302.530(48)(b), F.A.C. FDEP believes that the lake-specific NNC is more representative of natural conditions in the lake than the generally applicable TN, TP and Chl*a* NNC. The process used for identifying the water quality targets and establishing the nutrient TMDLs is explained in section I-4 of this document.

For Lake Denham, the modeled TN, TP, and Chl*a* concentrations under the natural background condition were 1.07 mg/L, 0.03 mg/L, and 24.5 µg/L, respectively. The natural background Chl*a* concentration was higher than the 20 µg/L NNC Chl*a* target. Therefore, the 20 µg/L was not selected as the target but instead, the 80th percentile of the modeled natural background TN and TP concentrations, i.e., AGM TN and TP concentrations of 1.10 and 0.04 mg/L, and the corresponding in-lake Chl*a* concentration of 26.8 µg/L, were established as targets for the Lake Denham nutrient TMDL. The detailed process for developing the water quality target is explained in Chapters 5 of the Report and is also summarized in section 3 below.

Assessment: The EPA concludes that FDEP has properly addressed its WQS when setting a numeric water quality target.

3. Loading Capacity - Linking Water Quality and Pollutant Sources

As described in the EPA guidance, a TMDL identifies the loading capacity of a waterbody for a particular pollutant. The EPA regulations define loading capacity as the greatest amount of loading that a water can receive without violating WQS (40 CFR section 130.2(f)). The loadings are required to be expressed as either mass-per-time, toxicity or other appropriate measure (40 CFR section 130.2(i)). The TMDL submittal must identify the waterbody's loading capacity for the applicable pollutant and describe the rationale for the method used to establish the cause-and-effect relationship between the numeric target and the identified pollutant sources. In most instances, this method will be a water quality model. Supporting documentation for the TMDL analysis must also be contained in the submittal, including the basis for assumptions, strengths and weaknesses in the analytical process, results from water quality modeling, etc. Such information is necessary for the EPA's review of the load and wasteload allocations which are required by regulation.

In many circumstances, a critical condition must be described and related to physical conditions in the waterbody as part of the analysis of loading capacity (40 CFR section 130.7(c)(1)). The critical condition can be thought of as the "worst case" scenario of environmental conditions in the waterbody in which the loading expressed in the TMDL for the pollutant of concern will continue to meet water quality standards. Critical conditions are the combination of environmental factors (e.g., flow, temperature, etc.) that results in attaining and maintaining the water quality criterion and has an acceptably low frequency of occurrence. Critical conditions are important because they describe the factors that combine to cause a violation of WQS and will help in identifying the actions that may have to be undertaken to meet water quality standards.

As described in part I, section 4 of this decision document, the TP and TN loadings from the Lake Denham watershed were estimated using the curve number approach (further details are in Chapter 4 of the Report). The loadings to the lake corresponding to natural background conditions were determined and then adjusted until the BATHTUB model simulated the in-lake target concentrations (TN of 1.10 mg/L and TP of 0.04 mg/L). The nutrient loadings that resulted in the target concentrations were considered the TMDLs for the lake (TN = 16,468 kg/yr and TP = 593 kg/yr). Details on the relationship between nutrient loadings, in-lake nutrients and Chl*a* concentrations, and on the BATHTUB Model used in establishing the relationship and arriving the TMDLs for Lake Denham are all covered in Chapter 5 of the Report.

As mentioned in Appendix A-2 of the Report, the model simulated the 2000–12 period, which included both wet (2002, 2004, 2005, and 2009) and dry (2000 and 2006) years. During this period total annual average rainfall varied from 26.4 to 54.8 inches and averaged 44.7 inches. Thus consideration of both wet and dry years addresses nutrient loading from extreme storm water runoff events. Additionally, the impact of nitrogen fixation in the model was also considered, even though no directly measured data on nitrogen fixation specific to Lake Denham were available when the TMDL analysis was carried out. Measured dissolved inorganic nitrogen (DIN) and dissolved inorganic phosphorus (DIP) from the IWR database indicated that the annual DIN:DIP molar ratio in Lake Denham was about 10 as shown in Table 5.9 of the Report. This low DIN:DIP ratio suggested the necessary condition that can trigger nitrogen fixation existed in Lake Denham. Nitrogen fixation was used to explain the observed difference between the inflow TN concentrations and Lake Denham TN concentrations, as shown in Table 5.11 of the Report, and appropriate calibration factors were incorporated into the model to address large gaps between the model-simulated and the measured results.

Assessment: The EPA concludes that the loading capacity, having been calculated using the EPA-reviewed water quality models and using observed concentration data and water quality targets consistent with numeric water quality criteria, has been appropriately set at a level necessary to attain and maintain the applicable WQS. The H1 is based on a reasonable approach for establishing the relationship between pollutant loading and water quality.

4. Load Allocation (LA)

The EPA regulations require that a TMDL include LAs, which identify the portion of the loading capacity allocated to existing and future nonpoint sources and to natural background (40 CFR section 130.2(g)). LAs may range from reasonably accurate estimates to gross allotments (40 CFR section 130.2(g)). Where it is possible to separate natural background from nonpoint sources, LAs should be described separately for background and for nonpoint sources.

If the TMDL concludes that there are no nonpoint sources and/or natural background, or the TMDL recommends a zero load allocation, the LA must be expressed as zero. If the TMDL recommends a zero LA after considering all pollutant sources, there must be a discussion of the reasoning behind this decision, since a zero LA implies an allocation only to point sources will result in attainment of the applicable WQS, and all nonpoint and background sources will be removed.

As stated in the Report, a 61% reduction in current TN and TP loadings will be required to achieve the target load. The load reduction needs to apply to surface runoff and nitrogen fixation for TN. Since the load reduction for nitrogen fixation and internal loads are associated with the watershed load reduction, a reduction in nutrient loadings from human nonpoint sources will lead to a reduction in the nutrient

loading from nitrogen fixation and internal recycling. FDEP estimates that when TP is reduced by 61%, phytoplankton biomass will decrease, and in turn nitrogen fixation and internal recycling rates will be reduced to background natural conditions.

Assessment: The EPA concludes that the LAs provided in the Report are reasonable and will result in attainment of the WQS.

5. Wasteload Allocation (WLA)

The EPA regulations require that a TMDL include WLAs, which identify the portion of the loading capacity allocated to existing and future point sources (40 CFR section 130.2(h)). If no point sources are present or if the TMDL recommends a zero WLA for point sources, the WLA must be expressed as zero. If the TMDL recommends a zero WLA after considering all pollutant sources, there must be a discussion of the reasoning behind this decision, since a zero WLA implies an allocation only to nonpoint sources and background will result in attainment of the applicable WQS and all point sources will be removed.

In preparing the wasteload allocations, it is not necessary that each individual point source be assigned a portion of the allocation of pollutant loading capacity. When the source is a minor discharger of the pollutant of concern or if the source is contained within an aggregated general permit, an aggregated WLA can be assigned to the group of facilities. However, it is necessary to allocate the loading capacity among individual point sources as necessary to meet the WQS. The TMDL submittal should also discuss whether a point source is given a less stringent wasteload allocation based on an assumption that nonpoint source load reductions will occur. In such cases, the state/tribe will need to demonstrate reasonable assurance that the nonpoint source reductions will occur within a reasonable time.

Within the Lake Denham watershed, the stormwater collection systems owned and operated by Lake County and the City of Leesburg are covered by NPDES MS4 Phase II permits (FLR04E106 and FLR04E110, respectively). The areas within their jurisdiction in the Lake Denham watershed would be responsible for a 61% reduction of both TN and TP from current anthropogenic loading. FDEP noted that any MS4 permittee is only responsible for reducing the anthropogenic loads associated with stormwater outfalls that it owns or otherwise has responsible control over, and it is not responsible for reducing other nonpoint source loads in its jurisdiction. No NPDES-permitted wastewater discharges were identified in the Lake Denham watershed.

Assessment: The EPA concludes that the WLAs provided in the Report are reasonable and will result in the attainment of water quality standards. This is because the H1 accounts for all point sources discharging to impaired segments in the watershed and the WLAs require that TN and TP loads comply with water quality criteria.

6. Margin of Safety (MOS)

The statute and regulations require that a TMDL include a margin of safety to account for any lack of knowledge concerning the relationship between load and wasteload allocations and water quality (CWA section 303(d)(1)(C), 40 CFR section 130.7(c)(1)). The EPA 1991 guidance explains that the MOS may be implicit, i.e., incorporated into the TMDL through conservative assumptions in the analysis, or explicit, i.e., expressed in the TMDL as loadings set aside for the MOS. If the MOS is implicit, the conservative assumptions in the analysis that account for the MOS must be described. If the MOS is explicit, the loading set aside for the MOS must be identified.

The Report stated that, consistent with the recommendations of the Allocation Technical Advisory Committee (FDEP 2001), an implicit MOS was used in the development of the Lake Denham TMDLs. The implicit MOS was used because the TMDLs were based on the conservative decisions associated with a number of the modeling assumptions in determining the assimilative capacity (*i.e.*, loading and water quality response) for Lake Denham. Some examples of conservative decisions in modeling which added to the margin of safety were: 1) using a long-term simulation for the in-lake TN, TP, and Chl*a* concentrations for Lake Denham and using the mean values of geometric means of 13 years as input data, with the coefficient of variance, instead of using yearly simulations for modeling as detailed in section 3.2.2 of the Report; and 2) choosing the settling velocity model for both TN and TP, which follows first-order kinetics, instead of selecting another type of sedimentation model which assumes second-order kinetics and is better suited for lakes that develop thermal stratification during the summer. These models would have overestimated the net sedimentation in Lake Denham and in turn caused the in-lake TN and TP concentrations to be underestimated.

Assessment: The EPA concludes that the H1 incorporates an adequate margin of safety.

7. Seasonal Variation

The statute and regulations require that a TMDL be established with consideration of seasonal variations. The method chosen for including seasonal variations in the TMDL must be described (CWA section 303(d)(1)(C), 40 CFR section 130.7(c)(1)).

The models developed for hydrologic representation of the watershed flow conditions in Lake Denham used a 13-year period including all seasons and a full range of flow and meteorological conditions. Also as prescribed in paragraph 62-302.531(6), F.A.C., to calculate an AGM for TN, TP, or Chl*a*, there must be at least four temporally independent samples per year taken at least one week apart with at least one sample taken between May 1 and September 30 and at least one sample taken during the other months of the calendar year.

FDEP examined seasonal trends for TN, TP, and Chl*a* using the quarterly geometric mean values as was presented in Table 5.2 of the Report. There were no significant seasonal differences in TN and TP concentrations. The AGM of Chl*a* concentrations ranged from 48.7 to 118.2 µg/L and averaged 73.3 µg/L from 2000 to 2012. There were also no significant seasonal differences in Chl*a* concentration as was presented Figure 5.4a of the Report.

Assessment: The EPA concludes that seasonal variations were considered and that the H1 allocations ensure protection of WQS throughout all seasons.

8. Monitoring Plan to Track TMDL Effectiveness

The EPA's 1991 *document, Guidance for Water Quality-Based Decisions: The TMDL Process (EPA 440/4-91-001), recommends a monitoring plan to track the effectiveness of a TMDL, particularly when a TMDL involves both point and nonpoint sources, and the WLA is based on an assumption that nonpoint source load reductions will occur. Such a TMDL should provide assurances that nonpoint source controls will achieve expected load reductions, and such a TMDL should include a monitoring plan that describes the additional data to be collected to determine if the load reductions provided for in the TMDL are occurring and leading to attainment of WQS.*

Table A-3 of the Report describes water quality data collection efforts in Lake Denham and the downstream water (Lake Harris) by FDEP, Lake County, Lake Watch, and SJRWMD. The data collected through these monitoring activities will be used to evaluate the effect of best management practices (BMPs) implemented in the watershed on the lake's TN and TP concentrations in subsequent water quality assessment cycles. FDEP, Lake County, Lake Watch, and the SJRWMD will continue to carry out monitoring activities in Lake Denham to evaluate future water quality trends in the lake.

Assessment: Although not a required element of the EPA's TMDL approval process, FDEP indicated that several stakeholders would be carrying out monitoring activities in Lake Denham, which would help to gauge the progress toward attainment of WQS. The EPA is taking no action on the monitoring plan.

9. Implementation Plans

On August 8, 1997 Bob Perciasepe (the EPA Assistant Administrator for the Office of Water) issued a memorandum, "New Policies for Establishing and Implementing Total Maximum Daily Loads (TMDL)," that directs Regions to work in partnership with States/Tribes to achieve nonpoint source load allocations established for 303(d)-listed waters impaired solely or primarily by nonpoint sources. To this end, the memorandum asks that Regions assist States/Tribes in developing implementation plans that include reasonable assurances that the nonpoint source load allocations established in TMDLs for waters impaired solely or primarily by nonpoint sources will in fact be achieved. The memorandum also includes a discussion of renewed focus on the public participation process and recognition of other relevant watershed management processes used in the TMDL process. Although implementation plans are not approved by the EPA, they help establish the basis for the EPA's approval of TMDLs.

The implementation of TMDLs in Florida occur through specific requirements in NPDES wastewater and MS4 permits, and through local or regional water quality initiatives or Basin Management Action Plans (BMAPs). Florida implements statewide regulations to address the issue of nonpoint source pollution by requiring new development and redevelopment to treat stormwater before it is discharged. The state's water management districts are also required (Chapter 62-40, F.A.C.) to establish stormwater Pollution Load Reduction Goals (PLRGs) and adopt them as part of a Surface Water Improvement and Management plan, other watershed plan, or rule. PLRGs are a major component of the load allocation part of a TMDL.

This TMDL Report will be followed by the development and implementation of a BMAP, to reduce the amount of nutrients that caused the verified impairment of Lake Denham. A BMAP has already been adopted for the Upper Ocklawaha River Basin that includes Lake Harris (the downstream receiving water). Because of the relation between Lake Denham and Lake Harris, FDEP believes that it may be appropriate to include Lake Denham's restoration efforts in the Upper Ocklawaha BMAP.

Assessment: Although not a required element of the TMDL approval, FDEP discussed how information derived from the TMDL analysis process will be used to develop PLRGs and implement BMP's that support implementation of the TMDL. The EPA is taking no action on the implementation portion of the Report.

10. Reasonable Assurances

The EPA guidance calls for reasonable assurances when TMDLs are developed for waters impaired by both point and nonpoint sources. In a water impaired by both point and nonpoint sources, where a point source is given a less stringent wasteload allocation based on an assumption that nonpoint source load reductions will occur, reasonable assurance that the nonpoint source reductions will happen must be explained in order for the TMDL to be approvable. This information is necessary for the EPA to determine that the load and wasteload allocations will achieve water quality standards.

In a waterbody impaired solely by nonpoint sources, reasonable assurances that load reductions will be achieved are not required in order for a TMDL to be approvable. However, for such nonpoint source-only waters, States/Tribes are strongly encouraged to provide reasonable assurances regarding achievement of load allocations in the implementation plans described in section 9, above. As described in the August 8, 1997 Perciasepe memorandum, such reasonable assurances should be included in state/tribe implementation plans and "may be non-regulatory, regulatory, or incentive-based, consistent with applicable laws and programs."

The TMDL Report explains how the information provided in the TMDL will be used to implement restoration activities in the basin. Restoration activities, voluntary, and those developed and implemented under the BMAP, would depend heavily on the active participation of the SJRWMD, the Florida Department of Agriculture & Consumer Services (FDACS), the Florida Department of Transportation (FDOT), Lake County Water Authority, local governments, businesses, and other stakeholders. FDEP has stated that they would be working with these organizations and individuals to undertake or continue reductions in the discharge of pollutants and achieve the established TMDLs for impaired waterbodies. A number of these stakeholder (Lake County, Lake Watch, and SJRWMD, FDACS, FDOT) have already been actively involved in data collection and analysis, which is a good indication of their interest and commitment in restoring Lake Denham.

Assessment: The EPA considered the reasonable assurances contained in the Report. Point sources are required to comply with their NPDES permits, which must include the requirements and assumptions of the H1. Reductions for nonpoint sources are expected to occur as a result of the incentive and voluntary programs that were already in place or will be developed as part of the BMAP with active participation of its stakeholders.

11. Public Participation

The EPA policy is that there must be full and meaningful public participation in the TMDL development process. Each state/tribe must, therefore, provide for public participation consistent with its own continuing planning process and public participation requirements (40 CFR section 130.7(c)(1)(ii)). In guidance, the EPA has explained that final TMDLs submitted to the EPA for review and approval must describe the state/tribe's public participation process, including a summary of significant comments and the state/tribe's responses to those comments. When the EPA establishes a TMDL, the EPA regulations require the EPA to publish a notice seeking public comment (40 CFR section 130.7(d)(2)).

Inadequate public participation could be a basis for disapproving a TMDL; however, where the EPA determines that a state/tribe has not provided adequate public participation, the EPA may defer its approval action until adequate public participation has been provided for, either by the state/tribe or by the EPA.

FDEP published a notice of development of rulemaking on December 15, 2014 to initiate TMDL development for impaired waters in the Ocklawaha River Basin. A technical workshop for the Lake Denham TMDL was held on February 17, 2015 to present the general TMDL approach to local stakeholders. FDEP published an updated notice of development of rulemaking on April 6, 2015

covering the Ocklawaha River Basin, to address the need for TMDLs to be adopted within one year after the Notice of Development of Rulemaking was published. Public hearings for the Ocklawaha River Basin TMDLs (62-304.500 F.A.C.) were held on February 3, 2017 and April 21, 2017.

A notice of proposed rule to adopt the TMDLs (which would also constitute site specific numeric interpretations of the narrative nutrient criterion set forth in paragraph 62-302.530(90) (b), F.A.C.,) was published in Florida Administrative Register (FAR) Volume 42, Number 243, December 16, 2016. A notice of rulemaking to establish the TMDLs and to announce a rulemaking workshop to receive public comments was published in the FAR Volume 42, Number 129, July 5, 2016. A notice of public workshop (to be held on July 19, 2016) was also posted on the FDEP TMDL website and announced in local newspapers (Ocala Star-Banner)

FDEP reported that no formal written comments were received for the Lake Denham H1 TMDLs.

Assessment: The EPA concludes that the state involved the public during the development of the H1 and provided adequate opportunities for the public to comment on the TMDLs.

12. Submittal Letter

A submittal letter should be included with the TMDL analytical document, and should specify whether the TMDL is being submitted for a technical review or is a final submittal. Each final TMDL submitted to the EPA must be accompanied by a submittal letter that explicitly states that the submittal is a final TMDL submitted under section 303(d) of the CWA for the EPA review and approval. This clearly establishes the state/tribe's intent to submit, and the EPA's duty to review, the TMDL under the statute. The submittal letter, whether for technical review or final submittal, should contain such information as the name and location of the waterbody, and the pollutant(s) of concern.

Assessment: Accompanying the state's (May 2017) final TMDL for nutrients was a submittal letter dated June 19, 2017 from Frederick L. Aschauer, Jr. General Counsel, FDEP, requesting the review and approval of the nutrient TMDLs for: Wacissa River, Wacissa Springs, Crescent Lake, Lake Denham, Lake Weir, Marshall Lake, Lochloosa Lake, Cross Creek and Lake Roberts.

III. Conclusion

The Water Protection Division is **APPROVING** the H1 NNC and TMDLs addressed by this decision document in accordance with sections 303(c) and 303(d) of the CWA, as consistent with the CWA and 40 CFR parts 131 and 130, respectively.

The H1 NNC presented in this decision document will constitute the site specific numeric interpretation of the narrative nutrient criterion set forth in paragraph 62-302.530(48)(b), F.A.C., that will replace the otherwise applicable numeric criteria for nitrogen, phosphorus, and Chl*a* in subsection 62-302.531(2) for this particular water, pursuant to paragraph 62-302.531(2)(a), F.A.C. Based on the chemical, physical and biological data presented in the development of the H1 NNC outlined above, the EPA concludes that all of the aforementioned H1 NNC provide for and protect healthy, well-balanced, biological communities in the waters to which the NNC apply and are consistent with the CWA and its implementing regulations at 40 CFR section 131.11.

Therefore, the revised nutrient criteria for Lake Denham are 16,468 kg/yr for TN and 593 kg/yr for TP, expressed as a long-term (7-year) average of annual loads, not to be exceeded and 26.8 µg/L for Chl*a*, expressed as an AGM, not to be exceeded. All other criteria applicable to this waterbody remain in effect, including other applicable criteria at 62-302.531(2)(b). The requirements of paragraph 62-302.530(48)(a), F.A.C. also remain applicable.

Furthermore, after a full and complete review, the EPA finds that the *Nutrient TMDL for Lake Denham (WBID 2832A) and Documentation in Support of the Development of Site Specific Numeric Interpretations of the Narrative Nutrient Criteria* for TN & TP satisfies all of the elements of approvable TMDLs. This approval is for one TMDL submittal addressing one waterbody for use impairments due to nutrients.